

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>A61K 38/44, 38/47, G01N 33/569, C12N 9/14, 9/36</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/50069</b> <b>(43) International Publication Date:</b> 31 August 2000 (31.08.00)
<b>(21) International Application Number:</b> PCT/US99/04063 <b>(22) International Filing Date:</b> 25 February 1999 (25.02.99) <b>(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application</b> US Not furnished (CON) Filed on 25 February 1999 (25.02.99) <b>(71) Applicant (for all designated States except US):</b> NEW HORIZONS DIAGNOSTICS, INC. [US/US]; 9110 Red Branch Road, Columbia, MD 21045-2014 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> FISCHETTI, Vincent [US/US]; 448 Joan Court, West Hempstead, NY 11552 (US). LOOMIS, Lawrence [US/US]; 11374 Buckelberry Path, Columbia, MD 21044 (US). <b>(74) Agents:</b> SANDERCOCK, Colin, G. et al.; Foley & Lardner, Suite 500, 3000 K Street, N.W., Washington, DC 20007-5109 (US).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** A MEANS FOR THE PROPHYLACTIC AND THERAPEUTIC TREATMENT OF STREPTOCOCCAL INFECTIONS**(57) Abstract**

The present invention relates to compositions containing Group C streptococcal phage associated lysin enzyme for the prophylactic and therapeutic treatment of Streptococcal infections, including the infection commonly known as strep throat. Methods for therapeutically and prophylactically treating such infections also are described.

*FOR THE PURPOSES OF INFORMATION ONLY*

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

6. The composition according to claim 5, wherein said reducing agent is dithiothreitol.

7. The composition according to claim 3, wherein said  
5 buffer comprises a metal chelating agent.

8. The composition according to claim 7, wherein said metal chelating agent is ethylenediaminetetraacetic disodium salt.

10

9. The composition according to claim 3, wherein said buffer is a citrate-phosphate buffer.

10. The composition according to claim 1, further  
15 comprising a bactericidal or bacteriostatic agent as a preservative.

11. The composition according to claim 1, wherein said lysine enzyme is lyophilized.

20

12. The composition according to claim 1, wherein said carrier further comprises a sweetener.

13. The composition according to claim 1, wherein the  
25 carrier provides a concentration of from about 100 to about 100,000 active enzyme units per milliliter of fluid in the environment of nasal or oral passages.

What is claimed is:

1. A composition for use in the therapeutic or  
5 prophylactic treatment of a streptococcal infection,  
comprising:

an effective amount of Group C streptococcal phage  
associated lysin enzyme; and

10 a carrier for delivering said lysin enzyme to a mouth,  
throat, or nasal passage.

2. The composition according to claim 1, wherein said  
carrier is selected from the group consisting of candy, chewing  
gum, lozenge, troche, tablet, powder, aerosol, liquid, liquid  
15 spray, nasal spray and nasal ointment.

3. The composition according to claim 1, further  
comprising a buffer that maintains pH of the composition at a  
range between about 4.0 and about 9.0.  
20

4. The composition according to claim 3, wherein said  
buffer maintains the pH of the composition at range between  
about 5.5 and about 7.5.

25 5. The composition according to claim 3, wherein said  
buffer comprising a reducing agent.

14. The composition according to claim 13, wherein said concentration is from about 100 to about 10,000 active enzyme units per milliliter of fluid in the environment of the nasal or oral passages.

5

15. The composition according to claim 1, wherein said composition is used in the therapeutic treatment of streptococcal infections.

10

16. The composition according to claim 1, wherein said composition is used in the prophylactic treatment of streptococcal infections.

15

17. The composition according to claim 15, wherein said streptococcal infection is a streptococcal throat infection.

18. The composition according to claim 1, wherein said carrier is a candy.

20

19. The composition according to claim 1, wherein said carrier is a chewing gum.

20. The composition according to claim 1, wherein said carrier is a lozenge. 21. The composition according to claim 1, wherein said carrier is a troche.

25

21. The composition according to claim 1, wherein said carrier is a troche.

22. The composition according to claim 1, wherein said carrier is a powder.

23. The composition according to claim 1, wherein said  
5 carrier is an aerosol.

24. The composition according to claim 1, wherein said carrier is a liquid spray.

10 25. The composition according to claim 1, wherein said carrier is a nasal spray.

26. The composition according to claim 1, wherein said mammal is a human.

15 27. The composition according to claim 1, wherein said carrier is suitable for delivering said lysin enzyme to the mouth and throat.

20 28. The composition according to claim 1, wherein said carrier is suitable for delivering said lysin enzyme to the nasal passage.

25 29. The composition according to claim 1, further comprising at least one agent effective for the therapeutic or prophylactic treatment of streptococcal infections or alleviation of symptoms thereof.

30. A method of therapeutically or prophylactically treating streptococcal infections comprising administering a composition in accordance any one of claims 1-29 to a mammal in need thereof.

5

31. The use of Group C streptococcal phage associated lysin in the manufacture of a pharmaceutical composition according to any one of claims 1-29.

10

**THIS PAGE BLANK (USPTO)**



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/04063

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A61K 38/44, 38/47; G01N 33/569; C12N 9/14, 9/36

US CL :Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/7, 29, 34, 30, 36, 195, 206, 961, 962, 975; 424/94.1; 94.6, 94.61; 436/518, 524, 531, 533, 536, 808

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,604,109 A (FISCHETTI et al.) 18 February 1997, see entire document.	1-9,11, 15-17
Y		----- 10, 12-14, 18-31
Y	US 3,852,424 A (GAEUMANN et al.) 03 December 1974, see entire document, particularly, col. 12, line 62 through col. 13, line 7.	1-31



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*g* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

03 MAY 1999

Date of mailing of the international search report

21 JUN 1999

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized Officer

IRENE MARX

Telephone No. (703) 308-0196

**THIS PAGE BLANK (USPTO)**

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/04063

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

435/7, 29, 34, 30, 36, 195, 206, 961, 962, 975; 424/94.1; 94.6, 94.61; 436/518, 524, 531, 533, 536, 808

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

APS, JPOABS, EPOABS, CAPLUS, BIOSIS, MEDLINE, AGRICOLA

search terms: streptococc?, page associated lysin?, carrier, nose or nasal, throat, mouth, oral; spray, ointment, liquid, aerosol; gum

**THIS PAGE BLANK (USPTO)**